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10/814,714

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Heinz H. Busta

100067

9863

29050

7590

07/25/2007

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EXAMINER

VIJAYAKUMAR, KALLAMBELLA M

ART UNIT

PAPER NUMBER

1751

MAIL DATE

DELIVERY MODE

07/25/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/814,714

Applicant(s)

BUSTA ET AL.

Examiner

Kallambella Vijayakumar

Art Unit

1751

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-8,12-16,18 and 21-36 is/are pending in the application.
- 4a) Of the above claim(s) 29-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-8,12-16,18,21-28 and 36 is/are rejected.
- 7) ☒ Claim(s) 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

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DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05/15/2007 has been entered.

Claims 1, 4-8, 12-16, 18 and 21-36 are currently pending with the application. Claims 1, 16, 18, 22 and 36 were amended. Claims 2-3, 9-11, 17 and 19-20 cancelled. Claims 29-35 are withdrawn from further consideration.

Claim Objections

Claim 22 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The instant claim recites the limitation of "a non-photoresist" that is not further limiting the resins/media in claim-18.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4-8, 12-16 and 21-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claims 4-8 and 12-16 recite the limitation "The invention of claim" in Line-1. There is insufficient antecedent basis for this limitation in the claim.

Applicants are suggested to amend this limitation to "The composition of claim" to overcome this rejection.

Claims 21-22 recite the limitation "The invention" " in Line-1. There is insufficient antecedent basis for this limitation in the claim.

Applicants are suggested to amend this limitation to "The method of claim" to overcome this rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1, 4-8 and 12-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Tuck (WO 02/03413).

The US 2004/0025732 is being used as the equivalent of WO 02/03413 in the present rejection.

Tuck et al teach a field emission device containing an array of field electron emitters formed by printing an ink containing: (i). A plurality of first particles such as Graphite; (ii). A plurality of second particles such as **carbon black**, (iii). An insulating material such as amorphous **silica or ormosil**; (iv). A

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binder such as PVA/cellulose derivatives dispersed in a solvent or **methacrylate polymers** dissolved in solvents; and (v). A dispersing agent comprising modified **polyurethane** in butyl acetate or modified **polyacrylate** in methoxypropanol (Para 0106, 0016-0024, 0039-0040; 0056-0070; 0078, 0089, 0163, 0164) and making the device by screen printing the ink over a conductive surface forming a field emitter (Para 0022). The prior art teaches making an ink by mixing the components that are either same or substantially same as that claimed by the applicants, and coating the ink over a conductive substrate by spin coating, followed by drying/curing (Para, 0022, 0145; 0283-0287) thus forming a field emitter over a conductive substrate that is either porous or planar surface. With regard to a carbon black obtained by a specific process, the examiner asserts that prior art composition containing the carbon black will either be same or substantially same as that claimed by the applicants.

With regard to claim -4, the prior art teaches screen printing the ink over a conductive surface forming a field emitter (Para 0022).

With regard to claims 5-7, the prior art composition and its components are that are either same or substantially same as that by the applicants, and the examiner asserts that the art composition will be either be same or substantially same as that made using the composition having specific properties and containing the components that are not an essential part of the composition as claimed.

With regard to claims 8, prior art composition is either be same or substantially same as that claimed by the applicants, and identical compositions have identical properties.

With regard to claims 12-15, the prior art teaches a field emitter formed over a porous or planar surface (Para 0089, 0113), and the examiner asserts that the prior art composition and structure will be that are either same or substantially same as that formed by the instant claimed process step in claim-14.

With regard to claim 16, the prior art teaches PMMA <photolith and diamond precursor> (See, Hiroka et al, Cl-1, Ln 56-67; Cl-2, Ln 31-41; and Tang et al US 20040245910, Para 0056). All the limitations of the instant claims are met.

The reference is anticipatory.

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2. Claims 1, 4-6, 8, 13 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Fujii et al (US 5,547,609).

The prior art teaches a coating/molding composition containing a PPE, a wax component, a carbon black (CI-5, Ln 44-49), a rubber material, an electroconductive inorganic filler, a polyolefin resin (CI-6, Ln 52-59) and non-electroconductive inorganic filler of silica (CI-7, Ln 4-7) (Abstract). With regard to a carbon black obtained by a specific process, the examiner asserts that prior art composition containing the carbon black from fuel oil will either be same or substantially same as that claimed by the applicants. With regard to the field emitter properties in claims 1 and 8, the prior art composition is either same or substantially same as that claimed by the applicants, and identical compositions possess identical properties.

With regard to claims 4, 13 and 15, the prior art teaches coating the surfaces with the composition (CI-1, Ln 8-10, 36-40).

With regard to claims 5-7, the prior art composition and its components are that are either same or substantially same as that by the applicants, and the examiner asserts that the art composition will be either be same or substantially same as that made using the composition having specific properties and containing the components that are not an essential part of the composition as claimed.

With regard to claim 8, prior art composition is either be same or substantially same as that claimed by the applicants, and identical compositions have identical properties.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 4-8 and 12-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Tuck (WO 02/03413) in view of Blanchet-Fincher et al (US 5,948,465).

The US 2004/0025732 is being used as the equivalent of WO 02/03413 in the present rejection.

Tuck et al teach a field emission device containing an array of field electron emitters formed by printing an ink containing: (i). A plurality of first particles such as Graphite; (ii). A plurality of second particles such as **carbon black**, (iii). An insulating material such as amorphous **silica or ormosil**; (iv). A binder such as PVA/cellulose derivatives dispersed in a solvent or **methacrylate polymers** dissolved in solvents; and (v). A dispersing agent comprising modified **polyurethane** in butyl acetate or modified **polyacrylate** in methoxypropanol (Para 0106, 0016-0024, 0039-0040; 0056-0070; 0078, 0089, 0163, 0164) and making the device by screen printing the ink over a conductive surface forming a field emitter (Para 0022). The prior art teaches making an ink by mixing the components that are either same or substantially same as that claimed by the applicants, and coating the ink over a conductive substrate by spin coating, followed by drying/curing (Para, 0022, 0145; 0283-0287) thus forming a field emitter over a

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conductive substrate that is either porous or planar surface. With regard to a carbon black obtained by a specific process, the examiner asserts that prior art composition containing the carbon black will either be same or substantially same as that claimed by the applicants.

The prior art is silent about the source of carbon black per the claim-1.

In the analogous art, Blanchet-Fincher et al teach carbon emitters comprising powders of graphite, micronized coke, polycrystalline diamond and carbon soot dispersed in a binder (Col-2, Ln 32-36) and measuring the field emitter properties as a function of applied voltage (Col-6, Ln 38-47).

It would have been obvious to a person of ordinary skill in the art to substitute the carbon black in the composition of Tuck with carbon black obtained from other sources including carbon soot or particulate from oils as functional equivalent with reasonable expectation of success, because carbonaceous electron emitters were well known in the art at the time of disclosure of the invention by the applicants as shown by the teachings of Blanchet-Fincher.

With regard to claim-4, the prior art teaches screen printing the ink over a conductive surface forming a field emitter (Para 0022).

With regard to claims 5-7, the prior art composition and its components are similar to that by the applicants, and the examiner asserts that the art composition will be similar to that made using the composition having specific properties and containing the components that are not an essential part of the composition as claimed.

With regard to claims 8, prior art composition is similar to that claimed by the applicants, and similar compositions are expected to possess similar properties.

With regard to claims 12-15, the prior art teaches a field emitter formed over a porous or planar surface (Para 0089, 0113), and the examiner asserts that the prior art composition and structure will be similar to that formed by the instant claimed process step in claim-14.

With regard to claim 16, the prior art teaches PMMA <photosist and diamond precursor> (See, Hiroka et al, CI-1, Ln 56-67; CI-2, Ln 31-41; and Tang et al US 20040245910, Para 0056).

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4. Claims 18 and 21-28 are rejected under 35 U.S.C. 103(a) as being obvious over Tuck (WO 02/03413) in view of Blanchet-Fincher et al (US 5,948,465).

The US 2004/0025732 is being used as the equivalent of WO 02/03413 in the present rejection.

Tuck et al teach a field emission device containing an array of field electron emitters formed by printing an ink containing: (i). A plurality of first particles such as Graphite; (ii). A plurality of second particles such as **carbon black**, (iii). An insulating material such as amorphous **silica or ormosil**; (iv). A binder such as PVA/cellulose derivatives dispersed in a solvent or **methacrylate polymers** dissolved in solvents; and (v). A dispersing agent comprising modified **polyurethane** in butyl acetate or modified **polyacrylate** in methoxypropanol (Para 0106, 0016-0024, 0039-0040; 0056-0070; 0078, 0089, 0163, 0164) and making the device by screen printing the ink over a conductive surface forming a field emitter (Para 0022). The prior art teaches making an ink by mixing the components that are similar to that claimed by the applicants, and coating the ink over a conductive substrate by spin coating, followed by drying/curing (Para, 0022, 0145; 0283-0287) thus forming a field emitter over a conductive substrate that is either porous or planar surface.

Tuck fails to teach the measuring the field emitter properties per claim-18.

In the analogous art, Blanchet-Fincher et al teach carbon emitters comprising powders of graphite, micronized coke, polycrystalline diamond and carbon soot dispersed in a binder (Col-2, Ln 32-36) and measuring the field emitter properties as a function of applied voltage (Col-6, Ln 38-47).

It would be obvious to a person of ordinary skill in the art to measure the properties of the field emitter during the process of making the composition as routine quality control function of the process control to optimize the process steps as shown by the measurements by Fincher et al with reasonable expectation of success, because the combined prior art teaching is suggestive of the claimed process step.

With regard to claim 21, the prior art teaches methacrylate polymers <photoresist> (See Angelo et al, US 4,376,057; Cl-2, Ln 7-10).

With regard to claim 22, the prior art teaches polyurethane.

With regard to claim 23, the prior art teaches curing the composition.

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With regard to claims 24-28, the prior art teaches making a field emitter over a conductive substrate that is either porous or planar surface (Para 0089, 0113).

5. Claim 36 rejected under 35 U.S.C. 103(a) as being unpatentable over Tuck (WO 02/03413) in view of Hattori et al (US 5,599,749).

The disclosure on the composition and method of making the field emitter by Tuck et al and Ma et al as set forth in rejection-1 under 35 USC 103(a) is herein incorporated.

The prior art fail to teach a step of planarizing the active cured layer containing the composition.

In the analogous art Hattori et al teach planarizing cured active layer of a field emitter containing DLC by CMP and its benefits with improved adhesion bonding and mechanical strength of the electron emitting layer (CI-14, Ln 60; CI-15, Ln-4-15).

It would have been obvious to a person of ordinary skilled in the art to planarize the active layer by CMP as a choice of design of the finishing step in the process of making the field emitter to benefit from improved mechanical strength of the electron emitting layer with reasonable expectation of success, because the combined prior art teaching is suggestive of the claimed process step.

6. Claims 1, 4-8, 12-15, 18 and 22-28 rejected under 35 U.S.C. 103(a) as obvious over Ma et al (US 2005/0224764) in view of Tuck (WO 02/03413) and Blanchet-Fincher et al (US 5,948,465).

Ma et al teach the composition of an electroconductive ink comprising: (i). Carbon fibrils; (ii). Carbon black; (iii). A binder comprising polyurethane, polyester, polyacrylic acid, epoxy; and (iv). A solvent such as butyl carbitol (Abstract, Para 0051, 0110, 0113, 0115, 0119). The prior art teaches making the ink with a viscosity of 1 to 50,000 cps by mixing the components (0052). The prior art further teaches forming a field emitter by depositing the ink over an Al-foil forming a pattern of squares and curing it (Para 0178) and further teaches measuring the emitter properties (Para 0179).

The prior art fails to teach the addition of silica particles in the composition per claims 1 and 18, and measuring the vertical resistance per the claim-18. However, the prior art teaches the criticality of

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viscosity and the addition of rheology modifiers in the composition, and printing the composition by screen printing (Para 0007, 0068 and 0075; Table-2).

In the analogous art, Tuck et al teach the addition of fumed silica to control the rheology of carbon based inks for Field electron emission devices that could be printed by screen printing (Title, Abstract, Para 0152, 0022).

In the analogous art, Blanchet-Fincher et al teach carbon emitters comprising powders of graphite, micronized coke, polycrystalline diamond and carbon soot dispersed in a binder (Col-2, Ln 32-36) and measuring the filed emitter properties as a function of applied voltage (Col-6, Ln 38-47).

It would have been obvious to a person of ordinary skilled in the art to include fumed silica rheology modifiers in the ink composition of Ma et al to benefit from improved rheology of the ink with reasonable expectation of success, because the Ma et al is suggestive of incorporating rheology modifiers and the combined prior art teaching is suggestive of the claimed composition and process step. Further, It would be obvious to a person of ordinary skill in the art to measure the properties of the filed emitter during the process of making the composition as routine quality control function of the process control to optimize the process steps as shown by the measurements by Fincher et al with reasonable expectation of success, because the Ma et al teaches measuring the resistances of the Field Emissive Coating (Para 0136) and the combined prior art teaching is suggestive of the claimed process step.

With regard to claims 4 and 12-15, the prior art further teaches forming a field emitter by depositing the ink over an Al-foil forming a pattern of squares and curing it (Para 0178), and structure will be similar to that formed by the instant claimed process step in claim-14.

With regard to claims 8, prior art composition is similar to that claimed by the applicants, and similar compositions are expected to possess similar properties.

With regard to claims 22-28, the prior art teaches mixing the components, coating a conductive substrate including planar, wire and flexible stainless steel screen, and drying the coated film forming the filed emitter wherein the art components and the process steps are similar to that by the applicants (Col-2, Ln 13-31; Col-3, Ln 53-Col-4, Ln 9; Col-5, Ln 36-40; Col-6, Ln 37-40; Col-7, Example-1).

Response to Arguments

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Applicant's response filed 05/15/2007 have been fully considered. Applicant's arguments are moot in view of the new rejections that have been cited above.

Applicant's amendment fails to overcome the objection to claim-22 for the reasons set forth above.. Applicant's argument that the examiner did not reject claim-9 over Tuck under anticipation is not persuasive (Res. Pg-7, Sec.IIA), because the prior art teaches silica and carbon black and "[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968). Applicant's argument that the cancellation of claims 9 and 20 moots the rejection over Tuck and Fincher is not persuasive (Res. Pg-9, Sec. B) because Claim-1 includes claim-9, and claim-18 includes claim-20.

For the reasons set forth above applicant's fail to patentably distinguish their composition and methods over the prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8.30-6.00 Mon-Thu, 8.30-5.00 Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on 571-272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KMV/
July 21, 2007.

/Mark Kopec/
Mark Kopec
Primary Examiner 1700